

- 15 -

Claims: What is claimed is:

1. **A device**; a static structural reinforcement connecting element comprised of an **aperture** created by, a **method**; a predetermined disposition of reinforcing members providing means to attain higher ductility, and composite action in structures.
2. The connecting **aperture device and method**, of claim 1, wherein said **aperture** device is comprised of any arrangement of elements of a truss when at least one continuous web element or at least one cord element is bent, folded tied, woven, or formed to a curvilinear waveform, aperture, or loop providing means for containment or girding of reinforcement within the area bonded by one or more truss elements.
3. The connecting **aperture device and method**, of claim 1, wherein said **aperture** device provides means for ductile connection of reinforcement.
4. The connecting **aperture device and method**, of claim 1, wherein an **aperture** comprised by a method of arrangement of one or more reinforcement elements girds and interconnects reinforcement in a framework providing means for a composite and ductile erection.
5. The connecting **aperture device and method**, of claim 1, wherein specifications can be tailored as to longitudinal truss elements, lateral cross elements, freely locatable reinforcement apertures, insulation cores, transverse spanning reinforcements, and cementation components as to design, size, spacing, materials, methodology, and manufacture as required by any particular engineered demands to provide means for strength and versatility use.
6. The connecting **aperture device and method**, of claim 1, wherein **trusses** are fabricated with a multiplicity of apertures along the horizontal length, alternating from side to side thus providing means for the

- 16 -

allowance, communication and flow through of said **apertures** by cross member reinforcement.

7. The connecting **aperture device and method**, of claim 1, wherein at least one element is comprised of cut, bent, woven, shaped, folded, looped, formed, twisted, tied, straight or curvilinear reinforcement elements of a material of the group consisting of mineral, metal, fiber, or chemical.
8. The connecting **aperture device and method**, of claim 1, wherein the device is disposed in a plurality along transverse faces of a truss providing a means where the reinforcement transfers forces through the reinforcement matrix in both tension and compression.
9. The connecting **aperture device and method**, of claim 1, wherein the aperture is formed by the innermost cross-sectional face of a web vertex and the outermost cross-sectional face of an inwardly mounted cord, leaving sufficient space for insertion of substantially perpendicular reinforcement, providing means for unification of a predetermined plurality of trusses, and reinforcement elements in longitudinal, lateral, and transverse axis.
10. The connecting **aperture device and method**, of claim 1, wherein a truss system comprising a plurality of trusses arranged in spaced apart, generally side-by-side relation embedded within a plurality of elongate insulation core braces, each individual core brace extending between and engaging adjacent trusses thus maintaining a desired spacing therebetween, the braces being arranged in a row extending generally orthogonally to the sides of the trusses such that the longitudinal axes of the braces and the trusses are generally coincident, said plurality of trusses compressively positioned by and between said insulation core modules, and interleaved between adjacent individual insulation panels at a predetermined spatial arrangement and relationship and extending the predetermined span of said cementation in such a manner that said cores are centered transversely in the truss webbing between said appositional

- 17 -

chord elements providing means for correct reinforcement embedment within the appositional cementation layers, and providing a vapor barrier, a means of insulation, and spatial alignment of said trusses.

11. The connecting **aperture device and method** of claim 1, wherein said **apertures** comprised of the predetermined disposition of web vertex, and cord elements of a truss or lattice structure are formed or bent at angles to the web so that they lie flush to one another to provide a means of rigidly affixing them together side by side, and align to one another contiguously to provide means for the free passage through and containment within said aperture device of crossing substantially perpendicular reinforcement elements.
 - a. The connecting **aperture device and method** of claim 1, wherein each truss in a given plurality is rotated in an opposite direction from adjacent trusses such that each truss affixed to each adjacent truss's appositional and adjacent mating **aperture** provides means to form a three dimensional panel, and folded plate structure.
 - b. The connecting **aperture device and method** of claim 1, wherein a truss structure is elaborated by assembling said trusses edge to edge in planes which intersect at aligned parallel longitudinal lines of vertices which alternate transversely from side to side of the resulting three dimensional space frame, said aligned vertices consequently also forming lateral parallel lines of the resulting system in a predetermined disposition such that they provide means to form said device.
 - c. The connecting **aperture device and method** of claim 1, wherein said curvilinear and or waveform webbing provides means for a three dimensional structural action once lateral or cross reinforcement and facings of cementations are installed.

- 18 -

- d. Lateral and transverse axes in cross section consequently resemble the longitudinal cross section, consisting of alternating triangular forms, neighboring triangles inverted, between parallel lines, the bases of said triangular cross section composed of either truss cords or lateral reinforcement passed through the cincturing vertices along the intersecting planes of the longitudinal trusses.
 - e. Said cords and lateral reinforcement form alternating lines transversely from side to side of the space frame along its longitudinal and lateral axes at the alternating vertices of the continuous web elements initially described.
 - f. The alternating intersecting planes of trusses across all three axes of the consequent space frame form substantially square based pyramidal structures affording a three dimensional structural matrix.
 - g. Each cinctured vertex of the frame is one corner of the square base of one or more said structures, depending upon its location at an edge, corner, or in the field of a panel of this configuration of space frame, as well as the summit vertex of an inverted neighboring one, the alternate square bases forming the substantially planar opposite surface lattices of the space frame.
12. The connecting ***aperture device and method of*** claim 1, wherein truss elements comprising one chord and one web are formed or bent of said web elements so that apertures are created at the web vertices without an affixed chord in simple, and or compound angles to said lattice in a manner to allow the insertion, and passage through, and cincture of longitudinal reinforcement or lateral field chords to any other chord or reinforcing element for use as a chord in apposition, which provides means to utilize said lattice for adding shear at panel ends, and around openings in panels, and at intersections of structures, and for construction of box beams, and three dimensional panel systems, and to allow diverse

- 19 -

structures to be placed together and rigidly affixed to one another juxtaposed so that there is a sharing of chords in apposition providing a means for design flexibility.

13. The connecting ***aperture device and method*** of claim 1, wherein structural elements of the family of wood, steel or other materials commonly used in structures can be fitted to act as a cord elements and become incorporated into the composite structure providing a means to develop a stronger bond and shear transfer within the hybrid assemblage of structural elements;.
14. The connecting ***aperture device and method***, of claim 1, wherein an aperture equipped truss is used as a spacer and support device for installation girding the chords of adjacent trusses providing means for alignment and bracing of components during construction and after completion of construction.
15. The connecting ***aperture device and method***, of claim 1, wherein lateral cross member reinforcement is installed after welded wire mesh or materials from the group consisting of fibrous, or sinuous materials, or other sheeting goods have been positioned so that said apertures protrude through said mesh or sheeting and provide a cincturing or girding and combining, providing means for increased ductility and composite action.
16. The connecting ***aperture device and method***, of claim 1, wherein said lattice elements containing said pre spaced cinctures can be laid flat, web face towards the ends of the plurality of elongated lattice elements' and provide a cinctured spatial alignment device that will add rigidity to the framework prior to the cementation and provide additional reinforcement and composite action, and ductile properties to the structural cementation.

- 20 -

17. The connecting ***aperture device and method***, of claim 1, wherein said cincturing ***aperture*** can be provided by rigidly affixing said web element to at least two cords by sandwiching, and or by weaving, and or folding, and or bending and said web element and is rigidly affixed to one or more chord elements in opposition forming one or more apertures in parallel or tangential or angular opposition for insertion of reinforcement elements of an elongated and sinuous nature to span between said apertures interconnecting, and girding, and cincturing said spanning reinforcement to said elongated lattice framework containing a plurality of said cincturing ***apertures*** along its span.
18. The connecting ***aperture device and method***, of claim 1, wherein a freely locatable aperture cincture element comprised of bent, woven or folded continuous loop reinforcement provides a means for attachment of structural elements into a composite network of reinforcement or to adjacent structural elements of an assembled framework and for connectivity to prior art components preventing relative movement of said attached elements to achieve higher ductility and transverse composite unification in tension as well as compression.
19. The connecting ***aperture device and method***, of claim 1, wherein a modular component composite panel system comprising a plurality of longitudinally extending spaced web trusses containing apertures is secured to appositional cementations, and other structures sandwiching a insulation core.